

# Announcements

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- Homework for tomorrow...  
(Ch. 25, Probs. )
- PHYS 132 labs begin *NEXT* week!
- Office hours...
  - MW 10-11 am
  - TR 9-10 am
  - F 12-1 pm
- Tutorial Learning Center (TLC) hours:  
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# Chapter 25

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## Electric Forces & Charges

## *Chapter 25 Preview...*

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### *Electrostatics*

- ▣ Electric charges & postulates
- ▣ Electric force
- ▣ Electric field

# Charge Model: Basic Postulates

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1. Rubbing an object either *adds* or *removes* charge.  
*More* vigorous rubbing produces a *larger quantity* of charge.
2. There are *only* 2 kinds of charge: *positive* & *negative*.
3. 2 *like* charges exert *repulsive* forces on each other.  
2 *opposite* charges *attract* each other.
4. The force between two charges is a *long-range* force.  
The magnitude of the force...
  - *increases* as the quantity of charge *increases*.
  - *decreases* as the distance between the charges *increases*.

## Charge Model: Basic Postulates, continued...

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5. *Neutral* objects have an *equal* mixture of both positive and negative charge. The rubbing process somehow manages to separate the 2.
6. There are two types of materials: *conductors* & *insulators*.
  - *Conductors* are materials through or along which *charge moves*.
  - *Insulators* are materials on or in which charges remain *fixed in place*.
7. Charge can be transferred from 1 object to another by *contact*.

# Charge

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Atoms are made up of..

- *Protons & neutrons (nucleus)*

- protons: 'heavy' & *positively* charged
- neutrons: no *net* charge, about same mass as protons
  - protons and neutrons are made up of quarks

- *Electrons*

- 'light' & *negatively* charged
- Fundamental particle, no structure, 'orbits' nucleus

*Notice:*

- charge is an *inherent* property of electrons and protons.
- *Fundamental* unit of charge:

$$\begin{aligned} q_e &= -e \\ q_p &= +e \end{aligned}$$